

101. Yater, F., E. Esporlas and I.R. Smith. Economic aspects of processing and marketing. In I.R. Smith and A.N. Mines (eds.) *Small-scale fisheries of San Miguel Bay, Philippines: economics of production and marketing*. ICLARM Technical Reports 8.

Economic Aspects of Processing and Marketing

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YATER, F., A.E. ESPORLAS and I.R. SMITH. 1982. Economic aspects of processing and marketing, p. 104-130. In I.R. Smith and A.N. Mines (eds.) *Small-scale fisheries of San Miguel Bay, Philippines: economics of production and marketing*. ICLARM Technical Reports 8, 143 p. Institute of Fisheries Development and Research, College of Fisheries, University of the Philippines in the Visayas, Quezon City, Philippines; International Center for Living Aquatic Resources Management, Manila, Philippines; and the United Nations University, Tokyo, Japan.

Abstract

This paper examines the pricing efficiency and related economic aspects of fish processing and marketing in two communities of San Miguel Bay, Philippines. Salting, dried fish processing and marketing and fresh fish marketing are covered. Pricing efficiency of the system was found to be low. Daily incomes for marketing intermediaries, except for a few large-scale wealthier fish driers, were comparable to those earned by fishing households in the communities.

It is argued that the best hope for improving processing and marketing in these communities lies in group activities that manage gasoline supply and processing to compete with existing suppliers and processors. Finally, recommendations for uniform weights and measures are made.

Introduction

A secondary objective of the economic component of the UPV(IFDR)-ICLARM multidisciplinary study of the small-scale fisheries of San Miguel Bay was to examine economic aspects of processing and marketing. In particular, the study addressed questions of spatial and form price efficiency in the system; that is the relationship between (1) spatial price differences and marketing costs, and (2) between form (fresh to processed) price differentials and processing costs. As explained in Smith et al. (this report), the study of marketing and processing was approached in this fashion because potential for improvement in the system to the possible benefit of small-scale fishermen could more easily be identified than through the more descriptive structural approach as originally espoused by Bain (1968) and often applied to Philippine marketing studies (e.g., BAEcon n.d.).

The study was only partially successful in this approach. As is true throughout the Philippines, fishery products of San Miguel Bay are often sold by volume rather than by weight. This was the case not only at the landings in Cabusao but also at the local markets in Libmanan and Sipocot. Accurate measurement of prices per kilogram by species under such circumstances was extremely difficult and the method eventually used was less than perfect.

Methodology

The estimation of prices of individual species in multispecies transactions requires prior information on (1) the total value of the transaction, (2) its total weight, (3) its composition, and (4) an index of relative prices. The first three of these data were obtained from sellers at the landings; the fourth was derived from daily inquiries of buyers who were asked to estimate the prices they would be willing to pay per kilogram of the major species expected to be landed that day. At the end of each day, a specially prepared program (see Appendix 3 of Smith, et al., this report) was used to calculate average prices by species. Weekly and monthly price summaries were then prepared.

Castillo landings, Castillo processors and markets in Libmanan and Sipocot were monitored approximately three days/week for a 12-month period, February 1980-January 1981. Data collection and tabulation were very time consuming and tedious. It was a necessary task, however, because secondary price data were not available for any of the sampled trading points in Cabusao, Libmanan or Sipocot. Secondary data on prices in Camaligan, Naga City and Sagang, Calabanga from the Philippine Fish Marketing (now Development) Authority (PFMA) were collected, which provided a check for consistency of the primary data.

A random sample of Cabusao and Sabang marketing intermediaries for fresh and dried products and processors were interviewed during March and April 1981 to collect data on marketing and processing costs.

To summarize, the data that were collected for this marketing and processing study were as follows:

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|--|--------|--|
| <ul style="list-style-type: none"> ● marketing and processing costs ● prices (by major species) at Castillo landings ● prices (by major species) at local markets <ul style="list-style-type: none"> — Libmanan (fresh and dried) — Sipocot (fresh and dried) — Cabusao (dried) — Sabang (fresh) — Camaligan (fresh) — Naga City (dried) | }
} | primary data

secondary data |
|--|--------|--|

Cabusao and Sabang are the two major landings along the southern coast of the Bay. They are also the most market oriented among the bayside Camarines Sur communities. Consequently, one would expect marketing efficiency to be higher here than in the more isolated communities with lower volume marketed and fewer buyers. An analysis of the major factors affecting the pattern and purpose of marketing for the Bay as a whole can be found in Esporlas (1982). Cabusao and Sabang were appropriate foci for this marketing study because the diversity of activity and scale there permitted a clear determination of the extent of marketing concentration and thus the potential (if any) for restructuring the marketing sector for the benefit of fishermen and consumers.

Salting

TECHNIQUES AND SPECIES USED

Salting of sergestid shrimp or *balao* has been a major processing activity in the San Miguel Bay area for many years. *Balao* make up 37% of the total catch of the Bay (Pauly and Mines 1982) and 56% of the landings in Castillo (Smith et al., this report).

Several products can be prepared from *balao*. The salting done by Castillo and Sabang processors is actually only the first step in the conversion of *balao* into fermented shrimp paste known as *bagaoong* (= *bagoong*). However, since there is no Bicol area market for *bagaoong*, most of the salted *balao* is shipped to Pangasinan province north of Manila which specializes in *bagaoong* preparation. Some of the salted *balao* is sold locally as *guinamos*, another shrimp paste which is mashed, sun dried and then sold in cake form (NSDB 1980). *Balao* that is simply salted (and not fermented or mashed) and where the whole shrimp can be seen is popular with local Bicol consumers.

After purchase, the *balao* is placed in a mixing tub, most often an old wooden boat. Salt is added to the *balao* in an approximate ratio of 1:4 and then thoroughly mixed. For every can of *balao* (a can is the local measure and weighs approximately 27 kg), 4 liters of water are also added to the mixture to increase its weight and to aid in salt absorption. The resulting product is packed for sale in cans with plastic liners.

COSTS AND RETURNS

During the survey in April 1981, 13 salting processors in Castillo and 12 in Sabang were identified, of whom seven were interviewed; two had daily sales of less than 750 kg; four had daily sales of 1,600-2,000 kg and one had daily sales of 7,000 kg. On average, these processors had been in the business for four years.

Compared to the average investment costs for a small-scale unit such as a mini trawler or gill-netter, the average investment cost of a *balao* processor was low at only P728 (Table 1). However, operating requirements were considerably higher (Table 2), requiring almost P4,000 daily for *balao* purchases and daily operating expenses (Tables 3 and 4). In fact, since many processors advanced gasoline to mini-trawl operators and did not receive payment for their product until after sale, the actual capital requirements were higher. The survey respondents estimated that approximately

Table 1. Average investment costs in pesos for salting of *balao*, San Miguel Bay, April 1981.

Item	Average no. owned (n_i)	Average acquisition cost per item (C_i)	Expected life (yr)	Average annual depreciation per item (D_i)
Drying trays	42	3.29	4	0.82
Push cart	0.4	80.00	10	8.00
Baskets	16	5.00	1	5.00
Mortar/pestle	0.4	26.00	10	2.60
Wooden tubs	0.7	87.00	10	8.70
Weighing scale	0.9	88.00	7	12.60
Wooden boxes	0.1	120.00	10	12.00
Storage shed	0.6	500.00	5	100.00
Calculator	0.1	120.00	3	40.00
Stapler	0.1	30.00	10	3.00

Average investment costs
per respondent = $\sum n_i C_i = \text{P}727.70$

Average annual depreciation
per respondent = $\sum n_i D_i = \text{P}201.61$

Table 2. Average variable (operating) costs in pesos for *balao* salting, San Miguel Bay, April 1981.

Item	Daily cost	%	Annual cost
Salt	315	36	60,480
Plastic bags	25	3	4,800
Containers (baskets and cans)	405	47	77,760
Hired labor	70	8	13,440
Hired vehicle	22	3	4,224
Own fare	6	1	1,152
Snacks for laborers	18	2	3,456
Prorated annual costs			
maintenance/repair	1	—	192
bad debts	7	1	1,344
Total	869	100	166,848

Table 3. Daily costs and returns in pesos for *balao* salting, San Miguel Bay, April 1981.

	Average per processor
Daily purchases and sales (kg)	
Average quantity purchased	1,704
Average quantity sold	2,146
Percentage weight increase	26
Daily costs	
Cost of <i>balao</i> purchases	2,869
Prorated fixed costs ¹	2
Variable (operating) costs	869
Total daily costs	3,740
Daily returns	
Sales of salted <i>balao</i>	3,864
Daily net return to processor's own capital, labor and management	
Less opportunity cost of capital ²	1.70
Daily net return to processor's labor and management	122.30
Per kilogram costs and returns	
Average price paid	1.68
Average direct processing cost sold ³	0.41
Average selling price	1.80
Average net return to labor and management sold	0.06

¹Total of depreciation (P202) and license fee (P150) prorated over average 192 days of operation per year.

²Nine percent of investment cost (P728) and operating capital (P2,869) prorated daily.

³Fixed and variable (operating) costs only. Does not indicate net return to processor's own capital, labor and management.

₱10,000 capital was necessary to enter the business, placing the business on a par with most small-scale fishing gear. A final cost for entering the business is an annual license fee of ₱150.

NET RETURNS

Residual daily return to processor's labor and management (after deducting opportunity costs of capital) was ₱122, placing processors in a separate economic stratum from the fishermen who supply the *balao*, and on a par with the large-scale fish driers (see below). The number of *balao* processors has remained small due primarily to the high costs of entering this business, far beyond the reach of most small-scale fishing households.

There was no correlation between processing costs and volume of *balao* handled.

Fish Drying

TECHNIQUES AND SPECIES USED

The traditional methods of fish drying differ from community to community. In Sabang, the process includes washing, gutting, soaking in brine for 12 hours, and finally drying for 4-5 hours and packaging. In contrast, the process in Castillo involves dry-salting rather than soaking in brine.

Most fish dried in Sabang and Castillo are croakers, sardines, hairtail and trashfish. Croakers and sardines are the major catch of gill-netters which predominate in Castillo. In Sabang, where trawlers are more prevalent, the major species processed are anchovies and the trashfish bycatch.

In Sabang, anchovy landings are in the early morning, so the drying process can be completed within the same day. In Castillo, since anchovies are landed in the afternoon, the earliest that effective sun drying can begin is the next day. Ice is sometimes used to preserve the catch. A more common process, however, is to spread the anchovies on the drying trays immediately and leave them exposed to the air overnight, completing the process the next day. Since the resulting dried anchovies have similar physical characteristics to those which are iced overnight and thus no negative price differential, the traditional non-icing method is more economical. Anchovies are not put through the brining process because it would cause softening which would eventually rupture the belly portion, altering the physical appearance and lowering the value.

To determine the weight loss for the major species processed using traditional methods, samples of the product were weighed both before and after drying. The following percentage weight recoveries were determined:

Anchovies	: 60-70% weight recovery
Trashfish	: 55% weight recovery
Sardines	: 55% weight recovery
Hairtail	: 45-50% weight recovery
Croakers	: 45-50% weight recovery

This information was needed so that the price of the fresh fish could be adjusted for weight loss in processing before the processing margin was determined.

COSTS AND RETURNS

Costs and returns data for drying prorated on a daily basis, are summarized in Table 4 for 26 processors sampled. The respondents purchased an average volume of 182 kg/day at an average total cost of ₱489 or ₱2.69/kg. This average volume probably understated the daily volume handled throughout the year because data were collected in April when the peak fishing season had only recently begun. However, since daily prorated fixed costs (including depreciation) represented a small proportion of total daily costs, and there was only weak evidence of economies of scale (see next sub-heading), these figures have been used to estimate per kilo processing costs. Net returns to

Table 4. Daily costs and returns in pesos for fish drying, San Miguel Bay, April 1981.

	Castillo (n = 11)	Sabang (n = 15)	Below mean volume sold ¹ (n = 16)	Above mean volume sold ¹ (n = 10)	All processors (n = 26)
Daily purchases and sales (kg)					
Average volume purchased	138	215	83	341	182
Average volume sold	74	98	41	164	88
Percentage recovery	54	46	49	48	48
Daily costs					
Cost of purchases	471	502	252	867	489
Prorated fixed costs ²	5	7	4	9	6
Variable (operating) costs	54	78	38	116	68
Total daily costs	530	587	294	992	553
Daily returns					
Sales of product	664	633	314	1,177	646
Daily net return to processor's capital, labor and management					
	133	46	20	185	83
Less opportunity cost of capital ³	10	2	2	13	5
Daily net return to processor's labor and management					
	123	44	18	172	78
Per kilogram costs and returns					
Average price paid	3.41	2.33	3.04	2.54	2.69
Average direct processing cost sold ⁴	0.81	0.87	1.02	0.76	0.84
Average selling price	8.97	6.46	7.66	7.18	7.34
Average net return to labor and management sold	1.66	0.45	0.44	1.05	0.89
Margin ⁵	2.66	1.39	1.46	1.89	1.74

¹ Mean daily volume sold is 88 kg.

² Represents annual fixed costs prorated over 120 days of operation per year.

³ Nine percent of investment cost prorated over 120 days of operation per year.

⁴ Fixed and variable (operating) costs only. Excludes net return to processor's own capital, labor and management.

⁵ (Average price paid per kg ÷ percentage recovery) = effective price paid per kg. Margin per kg = (average selling price per kg minus effective price paid per kg).

a processor's capital, labor and management would vary with volume handled. The average fish drier operated 120 days/year, and annual costs were prorated to a daily basis to calculate costs and returns.

Major costs for drying included investment, fixed and operating costs. The average capital investment of the 26 respondents was ₱7,011. However, this figure was very skewed due to the presence in the sample of one processor who had a very substantial concrete storage facility; the remaining 25 respondents had an average investment of only ₱1,563 and this is a far more reasonable estimate of the costs of investing in fish drying in the area. Capital items included the processing establishment (*kamalitig*, which usually has a concrete floor, nipa roof and open walls), wooden or concrete tubs for brine, drying trays and racks and rattan baskets.

The major fixed cost was depreciation, averaging ₱683 annually. Other fixed costs included licenses and annual market stall fees which averaged ₱70. Prorated daily fixed costs totalled ₱6.

Daily operating costs averaged ₱68.30. Major cost items included hired labor (32% of total operating costs), salt (27%) and bad debts (11%). Much of the hired labor, especially in the smaller operations, was women and children (Yater 1982). Wage rates were lower in Castillo than in Sabang. Bad debts were those debts that processors incurred which they believed would never be repaid. Other cost items included containers, ice, freight for shipping the product to the market, and the processor's own transportation fees.

Fish driers sold an average of 88 kg daily for ₱646, or ₱7.34/kg. Deducting all costs, including opportunity costs of processor's capital (9% of investment cost), left a net return to processor's labor and management of ₱78/day. Significant differences were found between small processors (those selling less than the mean 88 kg/day) and larger processors. The latter earned an average net return to labor and management of ₱172 daily, or almost 10 times as much as the small processors. This was due to the fact that both purchase costs and direct processing costs were lower for the large processors and because their volume of business was approximately four times as high as for the small processors. Sabang processors, who dried lower priced species (anchovies primarily), earned considerably less residual income per day than did their Castillo counterparts who dried the higher priced croakers.

EASE OF ENTRY AND ECONOMIES OF SCALE

Except for the largest operations, the investment capital required to enter the fish drying business was less than that required to purchase a gill-net or mini trawl fishing unit. However, the daily operating capital required was higher. To achieve high volume of turnover requires capital for advances to fishermen, purchases of fish, direct processing costs, and storage. Consequently, around the Bay there were large numbers of small fish drying establishments but relatively few very large establishments. In Castillo, there was only one fish drier with the facility for storage of the dried product over any length of time. This ability to bulk the product resulted in higher prices received by this processor because he was able to supply transient buyers. All other Castillo fish driers sell their product as soon as possible because of their need for immediate cash to finance the next day's purchases. In some cases, especially in Sabang, processors do not pay the trawler operators for their catch until the processed product has been paid for by their buyers.

Exit from the business also was apparently easy, at least in the eyes of those fish driers who had made only small investments in their businesses. None thought he would have difficulty finding other income earning alternatives—35% of the 26 respondents would engage in the buying and selling of fresh fish; an almost equal number would invest in small or mini trawlers. In fact, many of these small processors were already engaged part-time in some of these other activities. Those who had the least capital invested would engage in such activities as net mending, portorage or as hired laborers in another's drying establishment if they themselves were no longer able to engage in the business.

Examination of economies of scale of operation in Castillo and Sabang showed that scale (in terms of volume sold) only explained 12% of the variation in average processing costs if a linear relationship was hypothesized, and even less if a log-log relationship was assumed. Consequently, there were very limited economies of scale in fish drying which is not surprising given the labor-intensive nature of the operation.

PRICE RELATIONSHIPS

Each processor dried several species. Consequently, it was impossible to ascribe the direct processing costs and net returns reported in the previous sections to costs of processing any particular species.

Further, there was no close correlation between prices of fresh and dried forms of three major fish types—croakers, mullet and herring—over the 12-month sampling period (Figs. 1-4). Other supply and demand factors, not measured in this study, were apparently involved in determining the product price relationships. One might be tempted to conclude that there is inadequate flow of market price information in the processing sector. However, the difference between the fresh and dried fish prices did not show great variation except in *banak* where there was a considerable decline in the difference after May 1980.

The difference between the price of fresh and dried fish is termed the mark-up, while the processing margin is the difference between the price of dried fish and the price of the fresh input adjusted for the weight loss during drying. The processing margin is designed to cover all processing

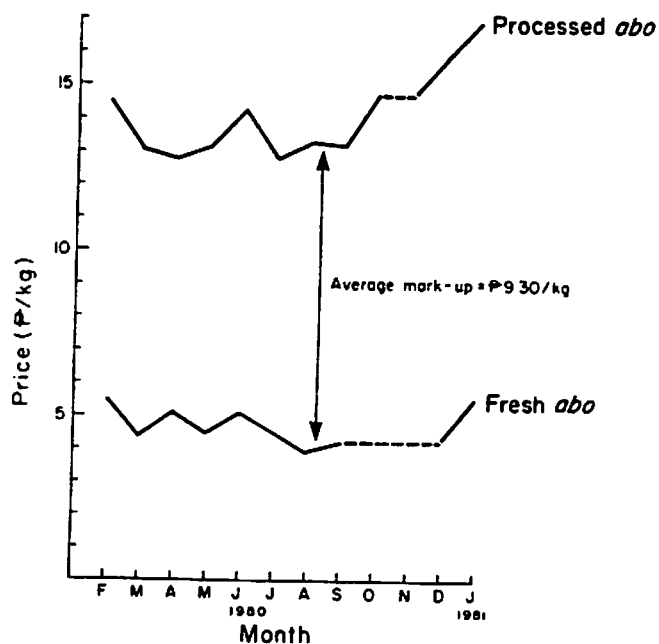


Fig. 1. Prices of fresh and dried croaker (*abo*) in Castillo, San Miguel Bay (1980-1981).

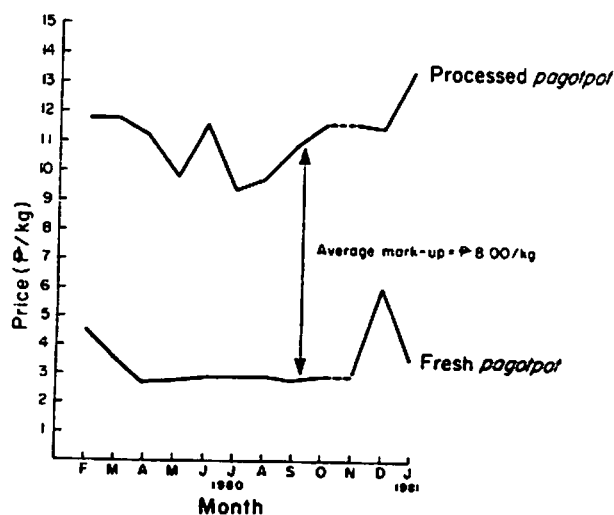


Fig. 3. Prices of fresh and dried croaker (*pagotpot*) in Castillo, San Miguel Bay (1980-1981).

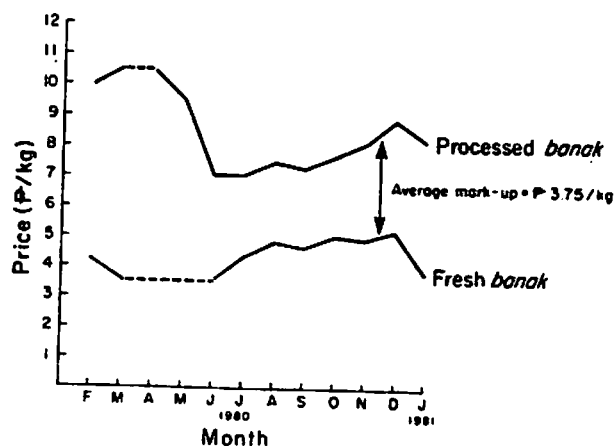


Fig. 2. Prices of fresh and dried mullet (*banak*) in Castillo, San Miguel Bay (1980-1981).

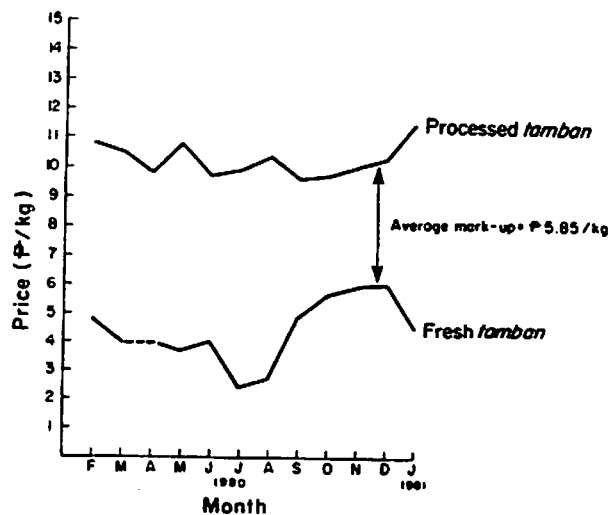


Fig. 4. Prices of fresh and dried herring (*tamban*) in Castillo, San Miguel Bay (1980-1981).

costs plus a reasonable return to the owner's own inputs (capital, labor and management) and risk. Risk due to bad debts was already taken into account when processing costs were itemized. Given the relative ease of entry into the fish-drying business, the reasonably steady mark-ups for these four species imply that the market forces of supply and demand have already settled the issue of whether or not the processing margin is reasonable given the costs and risks involved. It remains, however, that *on average* processors in Castillo and Sabang earned daily incomes that were considerably higher than the average daily incomes of fishermen. As noted earlier, however, large numbers of small processors earn daily incomes in the ₱15-20 range which is not much greater than the daily income of owners and crew of the gill-netters which supply much of the catch dried by these processors.

Dried Fish Marketing

The prices of dried fish in Castillo and the major nearby retail markets of Libmanan, Sipocot and Naga City were monitored for a period of one year, February 1980-January 1981. The purpose of this price monitoring was to establish the relationships (if any) among the prices in these four local markets, because such relationships determine the nature of product flows among the markets and the returns that can potentially be earned by middlemen who engage in dried fish marketing.

Although prices were collected for 13 different dried products, the results presented here focus on the four that were generally available in all four locations throughout the year:

Croaker (<i>abo</i>)	: split
Croaker (<i>pagotpot</i>)	: whole
Herring (<i>tamban</i>)	: whole
Mullet (<i>banak</i>)	: split

SPATIAL PRICE RELATIONSHIPS

Prices in Cabusao were monitored from one to three times per week depending upon the availability of the species. Libmanan and Sipocot prices were determined twice per week; once on the town's market day and once on an ordinary non-market day. Naga City prices were collected from the Philippine Fish Marketing Authority (PFMA). Cabusao prices were obtained from processors who were asked to provide us with the price/kg of their most recent sale. Libmanan and Sipocot retail prices were obtained from market vendors. In all three communities, 10-12 sellers were questioned on any given day of data collection. The observed prices for these four products are shown in the Appendix. The prices were surprisingly stable throughout the year.

In all cases, the relationship among Cabusao-Libmanan-Naga prices was as expected; that is, lowest at the source (Cabusao), higher at the nearby retail market (Libmanan), and the highest at the major city in the Bicol region (Naga). Prices at Sipocot which is a town along the national road between Naga and Daet, Camarines Norte, did not conform to expectations. Before beginning this study, it was hypothesized that Sipocot's proximity to the base of the Bay would lead its retail prices for dried fish being sufficiently higher than in Cabusao to warrant regular shipments of dried fish from Cabusao to Sipocot. However, during the course of this study, it was learned that the bulk of Sipocot's dried fish supply came from Mercedes in Camarines Norte. Mercedes' prices are reportedly lower than those of Cabusao. In fact, Sipocot middlemen often ship to the Libmanan market. For all four dried products, average prices in Sipocot were lower than in Libmanan and in all cases except for the split mullet, the Sipocot and Cabusao prices were almost identical.

Dried fish processed in Cabusao supplies both Manila and the local markets. The largest processor in Castillo, who handles an estimated 50% of the dried fish of the community, sells in bulk to agents representing Manila buyers. His product is not sold locally. The smaller processors, on the other hand, sell in smaller quantities to middlemen who double as retailers in the local markets. The

bulk of the sales of small processors is sold to consumers in Libmanan, the third largest municipality (after Naga City and Iriga City) in Camarines Sur with 75 barrios and a population of over 65,000 in 1975 (NCSO 1975). Smaller quantities are sold in Sipocot and Naga City markets. It was estimated that 50% of the total Cabusao supply is shipped to Manila, 40% is sold in Libmanan and the remaining 10% to Sipocot and Naga.

Given the observed price differentials, only occasional shipments from Cabusao to Sipocot would be profitable; Naga, with its larger population and retail market, is better able to absorb dried fish that cannot be absorbed by the Libmanan market. Just as Libmanan and Manila are the major markets for Cabusao, Naga and Manila are the major markets for Sabang, Calabanga on the opposite side of the Bicol River from Cabusao. In Sabang, the same pattern as in Castillo prevails; that is, large processors sell in bulk for the Manila market, small processors sell in smaller quantities to middlemen/retailers who supply the local provincial markets. These major flows of dried fish are shown in Fig. 5. Additional information on the marketing of dried fish from Siruma and Tinambac can be found in Esporlas (1982).

In addition to examining the spatial price differentials to determine trade flows, the extent of correlation among the various prices was also determined. A high degree of correlation between prices in any two markets implies a highly efficient information network between the two markets (Jones 1972). The low correlations found were surprising (Table 5). In part, this was due to the low variation in prices in any single location. The only product for which reasonable correlation was obtained was the split croaker (*abo*), the major dried product of Castillo, suggesting an adequate flow of price information for this species through some of the selected market channels. The generally low correlation coefficients imply that either the flow of information was poor or that those middlemen who bought wholesale in Cabusao and sold retail in Libmanan were able to control prices in Cabusao to their advantage. To shed more light on this question, the costs of marketing were compared with the price differentials.

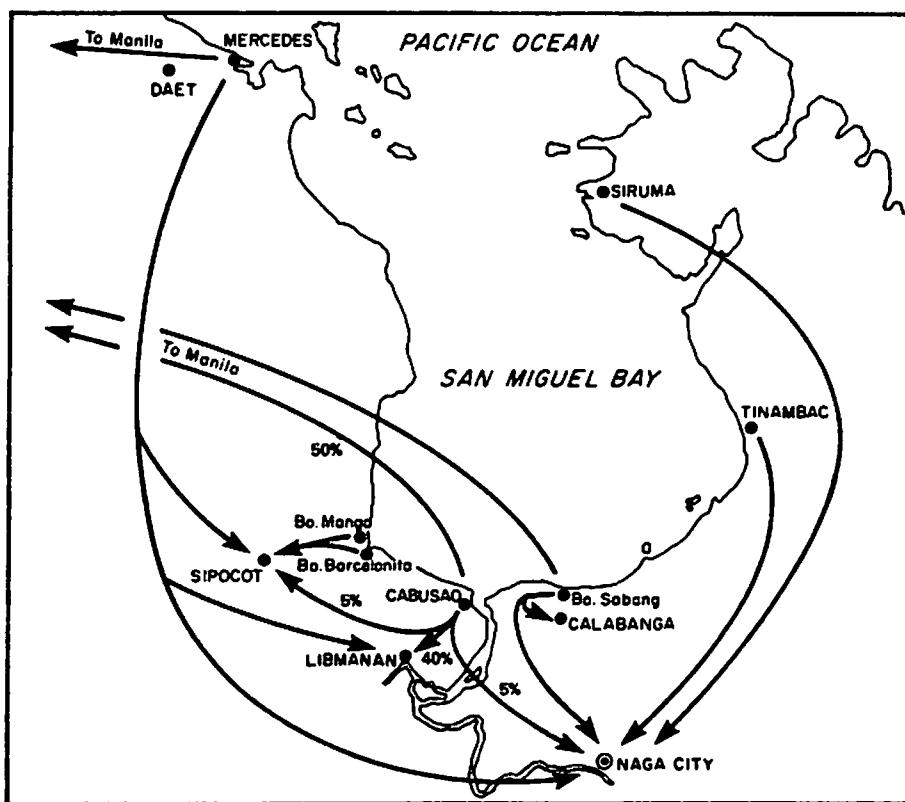


Fig. 5. Dried fish trade in the vicinity of San Miguel Bay.

Table 5. Spatial price relationships for selected species, San Miguel Bay, 1980-1981.

	Average price differential ¹ (P)	Correlation coefficient ²
<i>Whole croaker (abo)</i>		
Cabusao-Libmanan	0.86	0.71
Cabusao-Sipocot	0.02	0.72
Cabusao-Naga	3.65	0.22
Sipocot-Libmanan	0.84	0.78
Libmanan-Naga	2.79	0.10
Sipocot-Naga	3.63	0.24
<i>Split croaker (pagotpot)</i>		
Cabusao-Libmanan	1.03	0.28
Cabusao-Sipocot	-0.10	0.14
Cabusao-Naga	2.29	0.47
Sipocot-Libmanan	1.13	0.10
Libmanan-Naga	1.26	0.32
Sipocot-Naga	2.39	0.17
<i>Whole herring (tamban)</i>		
Cabusao-Libmanan	0.66	0.20
Cabusao-Sipocot	-0.35	0.36
Cabusao-Naga	1.68	0.17
Sipocot-Libmanan	1.01	0.40
Libmanan-Naga	1.02	0.42
Sipocot-Naga	2.03	0.33
<i>Split mullet (banak)</i>		
Cabusao-Libmanan	2.21	0.17
Cabusao-Sipocot	1.79	0.44
Cabusao-Naga	3.62	0.10
Sipocot-Libmanan	0.42	0.35
Libmanan-Naga	1.41	0.07
Sipocot-Naga	1.83	0.32

¹ Average price in first market minus average price in the second market.

² Based on paired observations of average weekly prices as shown in Tables 1-4.

MARKETING COSTS AND MARGINS

Variable costs for marketing dried fish were not high (Table 6). The major cost was the transportation of the middleman who must physically come to Cabusao to make purchases and return with them to Libmanan. In the case of Sipocot, it was usually Cabusao processors themselves who travelled to the market to sell their product. The fact that there are no regular dried fish middlemen serving this route is further evidence that the price differential is not regularly wide enough to warrant anything more than an occasional trip to Sipocot from Cabusao by processors when market conditions warrant it. The bulk of the product sold locally goes to Libmanan. Other variable marketing costs included those of market fees and freight.

Based on interviews with dried-fish middlemen, the marketing costs over the Cabusao-Libmanan and the Cabusao-Sipocot routes were estimated. Average marketing cost per kilogram of dried fish from Castillo to Libmanan was P0.16 and from Castillo to Sipocot was P0.51. The higher costs on the Sipocot route were the result of the small volume that was marketed, transportation expenses being the same whether 10 kg or 50 kg was transported.

Table 6. Average middleman daily costs and returns in pesos for dried fish marketing (Cabusao-Libmanan and Cabusao-Sipocot routes), San Miguel Bay, 1980-1981.

Per middleman costs and returns	
Daily purchases (kg)	33.1
Daily costs	
Cost of purchases	215.00
Prorated fixed costs ¹	1.27
Variable (operating) costs ²	9.49
Subtotal	225.76
Daily returns	
Sales of dried fish	236.00
Daily net return to middleman's capital, labor and management	10.24
Less opportunity cost of capital ³	0.11
Daily net return to middleman's labor and management	10.13
Per kilogram costs and returns	
Average price paid	6.50
Average marketing cost	0.32
Average selling price	7.13
Margin	0.63
Average net return to middleman's labor and management	0.31

¹Major investment items are weighing scale and various containers. Costs of these are prorated over the average operating 164 days/year of the dried fish middlemen.

²Major costs are own transportation (P5.67), freight charge (P1.07), market fees (P1.17) and bad debts prorated daily (P1.58).

³Based on 9% of average P1.98 investment cost prorated on daily basis.

Deducting these marketing costs from the daily returns for the two routes for the four species, provided a return to the middlemen's capital, labor and risk of P10.24. On average, Cabusao-Sipocot shipments would not be profitable because the average price differential (P0.34) did not cover the P0.51/kg marketing costs. On certain days, such as market days, however, the price differential was sufficient to offset marketing costs, and small shipments would be made along this route.

Based on the present survey, the average quantity marketed by the middlemen was only 33.1 kg, which provided a daily income of approximately P10.13 (after deducting opportunity costs of own capital, Table 6). Given this level of income for the 14 middlemen who regularly serve this route, it was not possible to argue that exorbitant profits are being earned. In fact, it was found that the prevailing attitude among those who sold dried fish in the local markets (and the fishermen and processors who supplied them) was one of live-and-let-live, each recognizing the other's need to share in the net returns that could be earned in the marketing system. Despite the ease of entry, initial capital requirements of less than P500, the Cabusao-based marketing system is very reminiscent of Szanton's (1972) observations on the 'right to survive' in rural Philippine markets, be they for fish or other produce.

Middlemen, or rather middlewomen, who handle most of the Cabusao dried fish supply destined for nearby retail markets, earned daily incomes comparable to those of most of the community's fishermen.

Fresh Fish Marketing

In contrast to *balao* salting and dried-fish processing and marketing, fresh fish marketing is not a major activity in Castillo, Cabusao. Other than iced shrimp which is shipped from the San Miguel Bay area primarily to Manila wholesalers, most of the fresh fish products from the Bay are sold locally. In Castillo, very little of the catch not destined for processing (salting or drying) reaches markets beyond Libmanan and Sipocot. There are seasonal variations to this pattern (Esporas 1982), but the major market for fresh fish landed in Castillo is Libmanan, and only secondarily Sipocot.

In contrast to the processing activities previously described where there were several large-scale businesses, fresh fish marketing over the Castillo-Libmanan route was handled by a relatively small group of 32 women from the two communities, each of whom bought and sold only small quantities. These women relied on public transportation, i.e., jeepneys (Fig. 6), to bring their purchases to Libmanan. Frequently travelling together in the same jeepney (only five to eight jeepneys service the Cabusao-Libmanan route on a regular basis) the quantities which each can handle were small, and at the time of the survey (April 1981), averaged only slightly more than 10 kg/middlewoman daily.

The shipments of fresh fish from Castillo to Sipocot were irregular, but when the relative market prices warranted it, fresh fish was marketed over this route. The average quantity handled per middlewoman was somewhat higher (16 kg), but so were their transportation expenses.

The fresh-fish catch landed in Barcelonita, another barrio in the western extremity of Cabusao was almost all marketed in Sipocot and Naga City; very little goes to Libmanan because there is no regular public transportation between Barcelonita and Libmanan. The Libmanan fresh fish supply thus comes almost entirely from the Cabusao barrios, such as Castillo, in the immediate vicinity of the Bicol River. Some pelagic species are also brought into the Libmanan market from Pasacao on the Ragay Gulf of the Bicol region.

For the purposes of the present survey, 14 of the 32 middlewomen who regularly bought fresh fish in Castillo and sold them in Libmanan were interviewed. Their total time involvement was 3-5 hours/day, 324 days/year. Those few who used the Castillo to Sipocot route worked about twice as long, 7-8 hours/day, and approximately the same number of days per year on average.



Fig. 6. Jeepneys are used extensively to move fish between communities where serviceable roads exist.

Attempts to determine middlewomen daily incomes were made using two methods. First, costs and returns based on the April 1981 survey data were estimated; second, spatial price differentials were compared with respective marketing costs. The two sets of data gave different results as reported below.

COSTS AND RETURNS

Based on the survey, the average investment costs for these middlewomen was very low (P35), most of the initial expense being for various-sized containers used to transport the purchases (Table 7). Major variable costs were for ice and transportation (Table 8), over and above the cost of their purchases. Total daily capital requirements ranged from P50 to P100 plus the credit extended to *suki* customers in Libmanan. No licenses were required for these middlewomen, though each paid a daily market stall fee in Libmanan or Sipocot.

Table 7. Average investment costs in pesos of fresh fish middlewomen (n = 14) who buy in Castillo and sell in Libmanan and Sipocot, San Miguel Bay, April 1981.

Item	Average no. owned (n_i)	Acquisition cost per item (C_i)	Expected life	Average annual depreciation per item (D_i)
Styrofoam boxes	0.125	40	1 yr	40
Weighing scale	0.06	150	6 yr	25
Containers				
Tubs (small)	0.188	11	1 yr	11
Pails	0.563	12	2 yr	6
Baskets (<i>tiklis</i>)	0.75	7	6 mo	14
Baskets (<i>baca-baca</i>)	0.06	8	6 mo	16
Other baskets	0.875	7	6 mo	14
Cans	0.06	8	2 mo	48
Average investment costs				
per middlewoman = $\sum n_i C_i = \text{P}35.16$				
Average annual depreciation				
per middlewoman = $\sum n_i D_i = \text{P}38.54$				

Table 8. Daily variable (operating) costs in pesos for fresh fish middlewomen who buy in Castillo and sell in Libmanan and Sipocot, San Miguel Bay, April 1981.

Item	Castillo-Libmanan	Castillo-Sipocot
Ice	0.75	3.00
Transportation		
Own fare (back and forth)	2.00	7.00
Freight	0.25	1.10
Market stall fee	0.30	1.50
Miscellaneous (snacks, etc.)	0.46	0.85
Total	3.76	13.45
Average volume handled (kg)	10.4	16.5
Average variable cost per kg	0.36	0.82
Average period worked per day (hours)	3-5	7-8

For their three to five hours of daily work, the Castillo-Libmanan middlewomen earned a return to their own labor, management and risk of approximately ₱10; the Castillo-Sipocot middlewomen who worked twice as long earned about twice this amount (Table 9).

The above results imply that fresh fish marketing is handled by predominantly low-volume part-time middlewomen who earn a daily return comparable to that earned by many of the fishermen from whom they make their purchases.

PRICES AND SPATIAL PRICE EFFICIENCY

In addition to interviews of fresh fish middlewomen, the prices of the major fresh fish species in Castillo, Libmanan and Sipocot were monitored for one year, February 1980-January 1981. These data were supplemented with secondary price data collected by the PFMA at Sabang and Camaligan landings near Naga City. The five major species monitored were the croakers (*abo* and *pagotpot*), mullets (*banak*), herring (*tamban*) and crabs (*kasag*). The price data for each of these five species are shown in Figs. 7-11.

As noted earlier, the prices of major species from multispecies transactions were estimated at the Castillo landings. There were also occasions when these species were sold singly; these prices were collected also. Except in the case of *tamban*, there was no significant difference between these

Table 9. Daily costs and returns in pesos for fresh fish middlemen who buy in Castillo and sell in Libmanan and Sipocot, San Miguel Bay, April 1981.

	Castillo-Libmanan	Castillo-Sipocot
Daily purchases and sales (kg)		
Average volume purchased and sold	10.4	16.5
Daily costs		
Cost of fresh fish purchased	45.25	85.00
Prorated fixed costs ¹	0.11	0.11
Variable (operating) costs	3.76	13.45
Total daily costs	49.12	98.56
Daily returns		
Sales of fresh fish	59.10	120.00
Daily net return to middleman's own capital, labor and management		
	9.98	21.44
Less opportunity cost of capital ²	0.01	0.01
Daily net return to middleman's own labor and management		
	9.97	21.43
Per kilogram costs and returns		
Average price paid	4.35	5.15
Average direct marketing cost ³	0.37	0.82
Average selling price	5.68	7.27
Average net return to labor and management	0.96	1.30

¹Total of depreciation (₱38.54) prorated over average 324 days of operation per year.

²Nine percent of investment cost (₱35.16) prorated daily.

³Fixed and variable (operating) costs only. Does not include net return to middleman's own capital, labor and management.

two sets of prices during the period of observation, so there was no price advantage for fishermen to sort their catch by species before sale.

Similar to the analysis of dried fish prices, the extent of correlation among the spatially diverse prices was determined for each species based on average weekly prices; in all cases it was found to be low. In no case did the correlation coefficient (r) exceed 0.75. In most cases, it was well below 0.50. Even on the Cabusao-Libmanan route no significant correlation was found between prices.

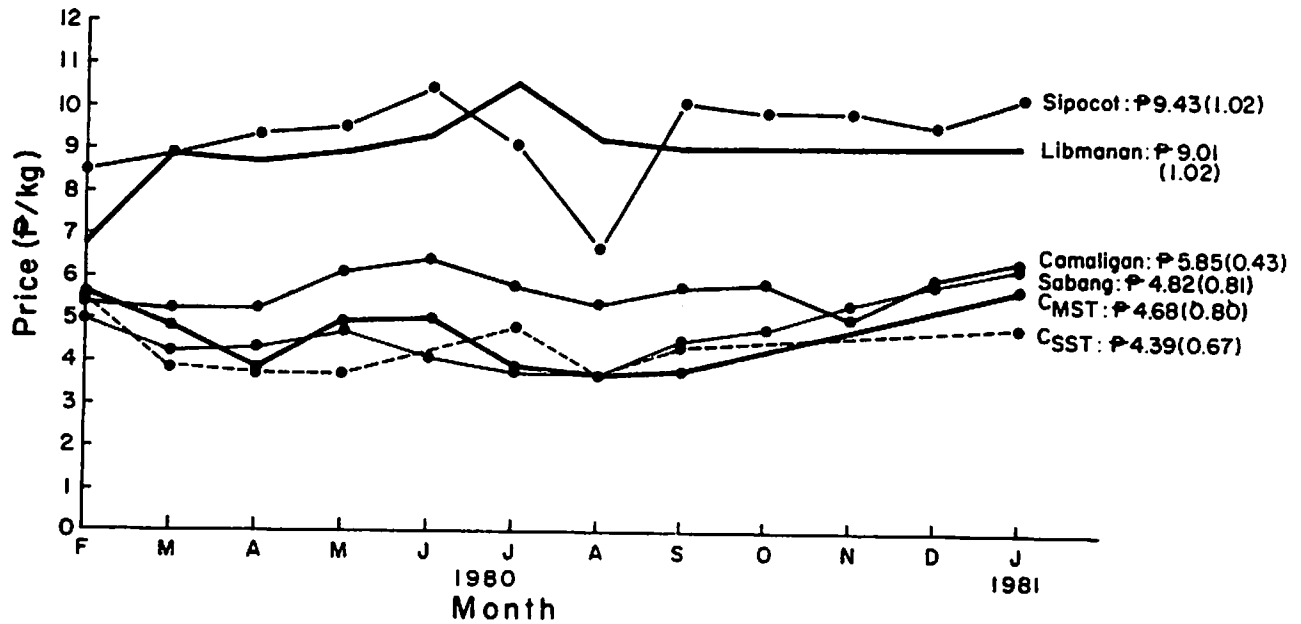


Fig. 7. Average monthly price for fresh croaker (*abo*) in selected landings and markets, San Miguel Bay, 1980-1981. Average prices for the 12-month period are shown with standard deviation in parentheses. CMST = Cabusao price for multispecies transactions; CSST = Cabusao price for single-species transactions.

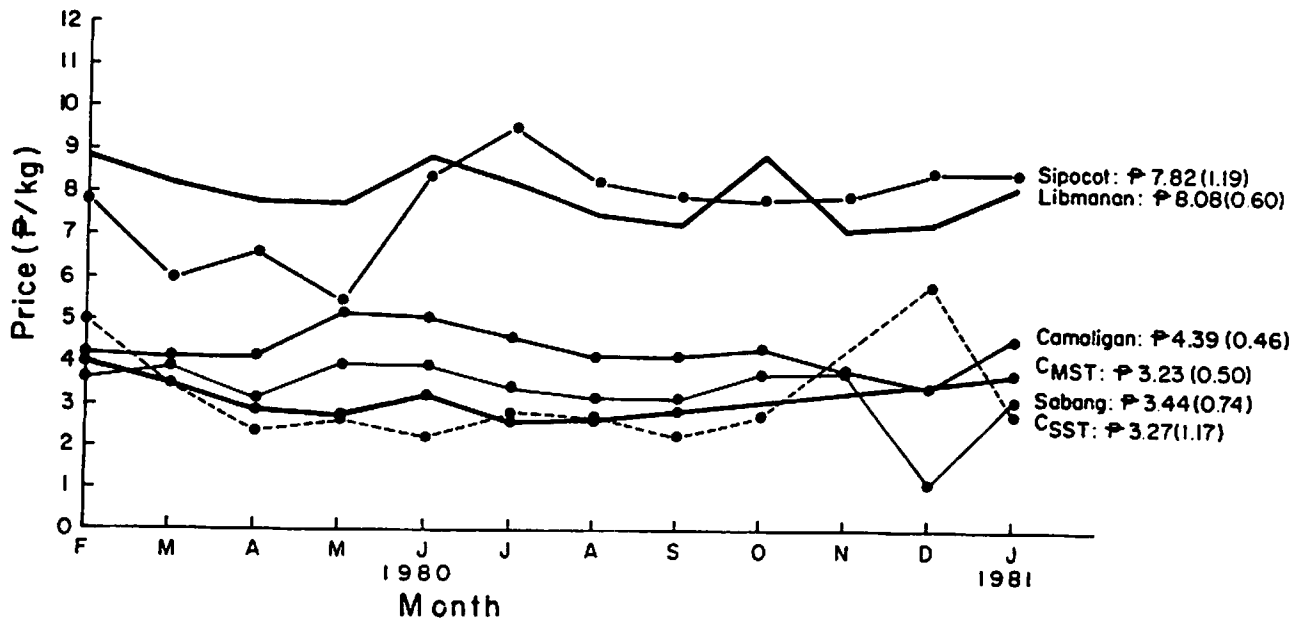


Fig. 8. Average monthly price for fresh croaker (*pagotpot*) in selected landings and markets, San Miguel Bay, 1980-1981. Average prices for the 12-month period are shown with standard deviation in parentheses. CMST = Cabusao price for multispecies transactions; CSST = Cabusao price for single-species transactions.

One cause of these low correlations was the reasonable stability of prices. The implication of these findings is that there was either a poor price information network or our price data were inaccurate. For all five species, the data were collected carefully and the relative prices appeared to be reasonably correct and consistent, that is, lower at the landings (Cabusao, Sabang, Camaligan) and highest in the markets (Libmanan and Sipocot).

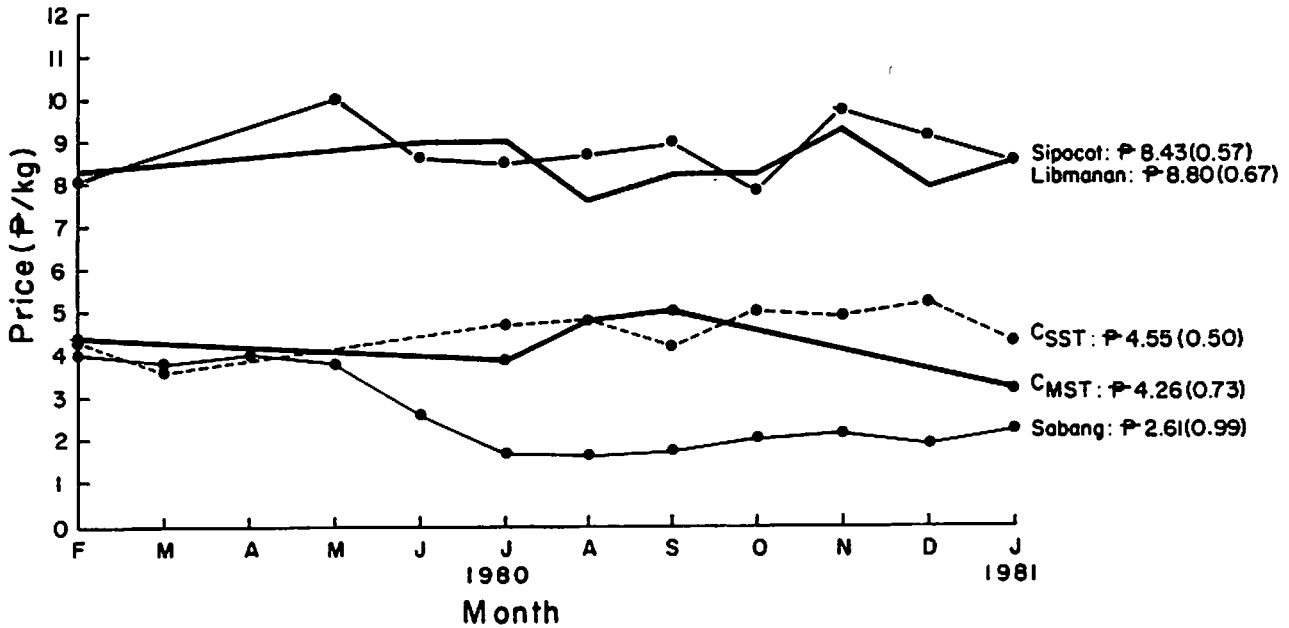


Fig. 9. Average monthly price for fresh mullet (*banak*) in selected landings and markets, San Miguel Bay, 1980-1981. Average prices for the 12-month period are shown with standard deviation in parentheses. C_{MST} = Cabusao price for multispecies transactions; C_{SST} = Cabusao price for single-species transactions.

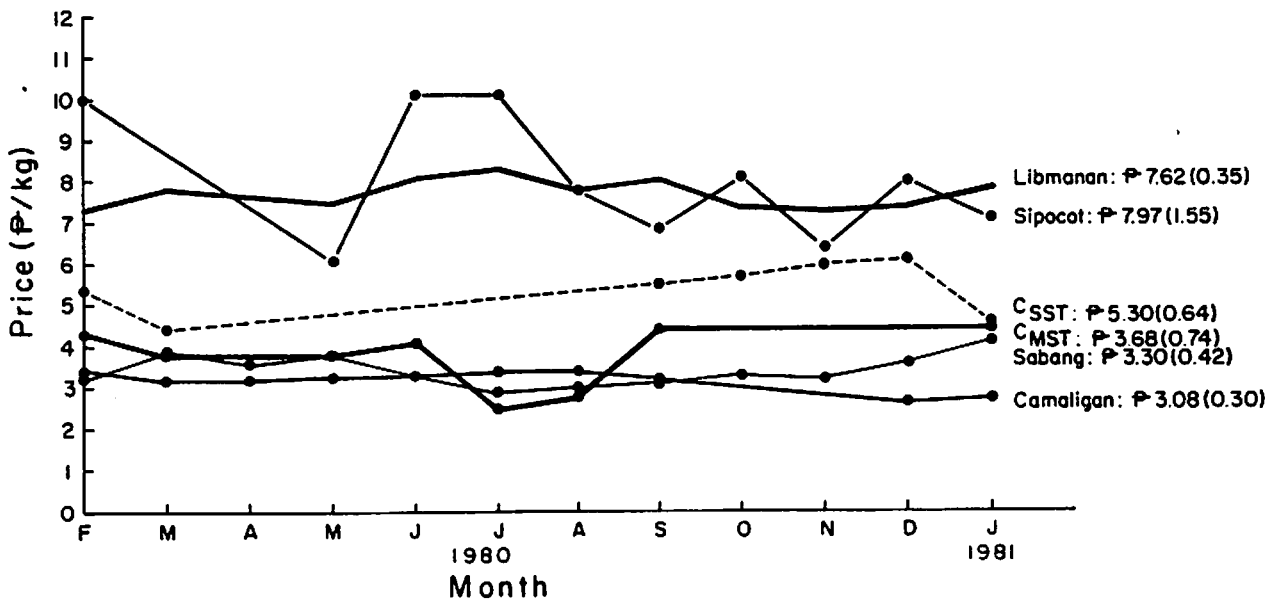


Fig. 10. Average monthly price for fresh herring (*tamban*) in selected landings and markets, San Miguel Bay, 1980-1981. Average prices for the 12-month period are shown with standard deviation in parentheses. C_{MST} = Cabusao price for multispecies transactions; C_{SST} = Cabusao price for single-species transactions.

Price (P/kg)

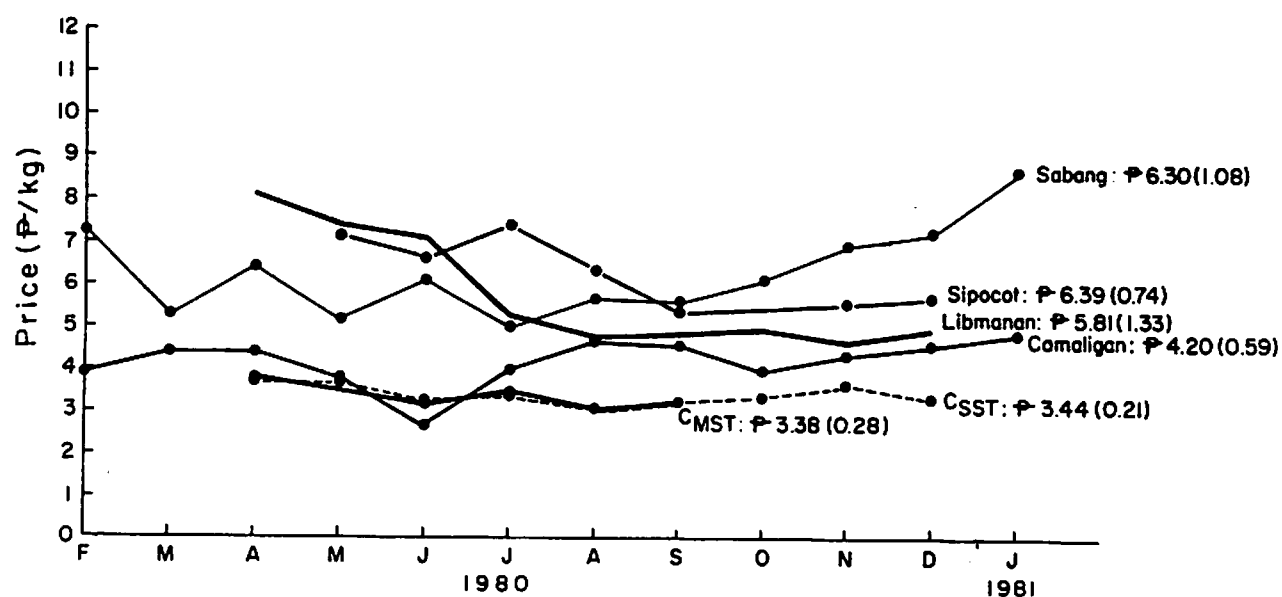


Fig. 11. Average monthly price for fresh crabs (*kasag*) in selected landings and markets, San Miguel Bay, 1980-1981. Average prices for the 12-month period are shown with standard deviation in parentheses. C_{MST} = Cabusao price for multispecies transactions; C_{SST} = Cabusao price for single-species transactions.

Nevertheless, the price differentials for the five species, based on these price data, were generally larger than the mark-ups derived from the prices (purchases and sales) information provided by the 14 fresh fish middlewomen interviewed in April 1981. Although the middlewomen assured the interviewers that the volume and cost data provided were "usual", it is believed that both the volume handled and the prices received were understated. The cost data provided appeared reasonable, based on assessment of 1981 marketing costs.

It was concluded that daily income of fresh fish middlewomen on the Cabusao-Libmanan route was probably closer to P35/day. The average price differential for the five species during 1980-1981 was P3.82/kg. Subtracting direct marketing costs of P0.37/kg (from Table 3) results in a return to the middlewomen's capital, labor, management and risk of P3.45/kg, considerably higher than the P0.96/kg determined by the survey of middlewomen.

Finally, the nature of the mark-ups for the five species was examined, using simple regression techniques ($P_y = \alpha + \beta P_x$); there was no consistent pattern. The mark-up between the receiving market Y and the shipping market X was constant ($H_0: \beta \neq 1$ rejected) for *abo* and *banak* and apparently based on a percentage ($H_0: \beta \neq 1$ not rejected) for *kasag*. For *pagotpot* and *tamban* β was not significantly different from zero, implying roughly constant prices in Libmanan, regardless of price fluctuations in Cabusao.

One major source of pricing inefficiency in the present marketing system is the practice of selling by volume rather than by weight. A second cause of pricing inefficiency is that the sole providers of price information to fishermen sellers for fresh fish are the middlewomen themselves. Fishermen or their wives have little knowledge of prevailing prices in Libmanan so the middlewomen have a bargaining advantage over the fishermen or female members of their households who sell the catch. These two factors, it is believed, are the primary causes of the high mark-ups that prevail between Cabusao and Libmanan for the five fresh fish species monitored in this survey.

Conclusions

Catches landed at Castillo, Cabusao fluctuated widely from month to month (see Smith et al., this report). Prices for the major species were considerably more stable. Fishermen and middlemen claimed that the usual inverse relationship between supply and prices did not hold for the San Miguel Bay landings. The present survey findings support their contention that when supply was high, demand in the form of larger numbers of buyers was also high. When supply was low, buyers were less likely to frequent the San Miguel Bay area and demand was thus also lower. The net result of this was that local prices tended to be reasonably stable as external demand (i.e., Manila), which draws on numerous fisheries throughout the country, fluctuated locally.

To this point, one of the selling methods at the landings, which is unique to the Philippines, has not been mentioned. Catches not predestined to particular buyers are sold through a whisper bidding system known as *bulungan*. It has been alleged on numerous occasions that this system results in prices paid being lower than would be the case if the bidding were open. No evidence was found, however, to indicate that this is the case nor did fishermen complain about this system. A careful collection and analysis of price data under alternative selling arrangements would be necessary to resolve this issue. The less rigorous observations of the *bulungan* system made during the survey were that it offered flexibility to fishermen sellers (or female members of their households) in selecting their buyers. They could, if they were not satisfied with the whisper bids received, open the bidding. They could also select the buyer whom they consider to be most reliable rather than necessarily the highest bidder, an important consideration if the seller was not paid until after the buyer has disposed of the purchases. In the assessment of the survey team, changes in the *bulungan* system would have marginal benefits, if any, for fishermen.

Cabusao's primary links with external markets (as distinct from local provincial markets) are through its processed products—salted *balao* and dried fish. Although no significant economies of scale were found to exist in either of these processes, the fish-drying activity in particular had a higher degree of market concentration than any of the other processing and marketing activities in the San Miguel Bay area. In Cabusao, a single processor had a 50% market share. In contrast, local dried and fresh fish marketing was performed by larger numbers of small-volume, low-income middlewomen.

Possibilities exist for technical improvements in processing. For example, the traditional drying procedures practiced in San Miguel Bay communities are quite different from those currently recommended by fish processing technicians from the University of the Philippines (NSDB 1980). The university technicians recommend a shorter 40-60 minute soaking period followed by a longer two- to three-day drying period. The longer soaking period of the traditional method allows more water to leach out at this stage which greatly shortens the required drying period. However, the salt content of the traditional product is very much higher; 13% by weight in contrast to 5% for the university recommended product. The rapid drying of the traditional product causes case (surface) hardening and leaves the inside still moist. The surface salt cakes after two weeks giving the traditional product a chalky, white appearance and a hard and brittle texture. It is also more hygroscopic than the recommended product because the surface salt tends to absorb moisture from the air thus leading to earlier spoilage.

The process recommended by the university technicians produces a product which is definitely of higher quality, but there are several reasons why the traditional process generally persists despite several years of extension effort in Castillo and other San Miguel Bay communities by the technicians. First, the traditional product with its higher salt and moisture content is heavier than its recommended counterpart. Buyers do not yet distinguish between the traditional and the recommended product so there is no incentive for the processor to produce a higher quality but lighter product because it is sold by weight. Buyers are not too interested either in the higher quality product because most of what they purchase is sold through the marketing channels to the final consumer

within two weeks, thus before salt-caking and brittleness becomes a problem. Recently, a group of women from Castillo have grouped together to obtain a government loan to continue the university recommended process and there is hope that both buyers and consumers will come to recognize the higher quality product and be willing to pay a premium for it. It will obviously take some time, however.

For fishing households to benefit from improvements in the processing and marketing sector, it will be necessary for them to become more involved in these activities. Because dried fish and salted *balao* are the largest volume products handled by the communities of Cabusao and Sabang, it is in this area that the greatest potential exists for group activities of fishing households. Presently there is no organized form of cooperation among fishing households and a major barrier to the successful formation of group efforts to compete with the large-scale processors will be the large operating capital requirement.

The investment costs for the processing activities are not high, but the fishermen's needs for gasoline advances demand considerable working capital of processors. In return for these advances, processors receive assurance of supply. Gasoline supply and processing are thus inextricably linked in Cabusao and any organization of fishermen in the area must be able to be competitive in both areas.

In conclusion, it is worth reiterating the need for an improved price information network; that is, a means to provide a check and balance to the present system which concentrates all price information in the hands of buyers. Improvement in the municipal monitoring of landings in the form of implementation of a uniform system of weights and measures would add considerably to the ease of making price comparisons between markets and locations. This recommendation is of more than mere academic interest (although it would certainly aid price analysis considerably) because any improved flow of market and price information in the processing and marketing sector will stimulate increased efficiency to the benefit of both fishermen producers and consumers.

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Appendix

Weekly Average Prices of Four Dried Fish Products in San Miguel Bay Area Markets 1980-1981

Table I. Weekly average price/kg of split croaker (*aba*) in pesos in selected markets, 1980-1981.

Date	Cabusao	Libmanan	Sipocot	Naga
Feb 1980	14.29	14.40	13.50	15.67
	14.63	15.65	—	17.00
	14.48	—	13.50	15.50
	—	—	—	—
Mar	13.38	14.90	13.50	16.00
	12.20	12.25	—	17.50
	13.33	13.75	14.00	16.50
	13.57	12.97	11.50	15.75
Apr	13.94	14.58	13.83	16.75
	13.13	13.23	13.34	16.00
	12.48	13.35	12.75	16.25
	11.54	14.44	12.60	15.80
May	11.83	13.25	11.67	16.80
	13.00	12.94	12.17	16.50
	14.56	13.00	13.44	17.25
	13.31	14.62	13.25	16.00
June	14.69	14.67	—	19.20
	14.33	14.69	13.46	19.67
	14.04	14.20	14.00	18.50
	14.06	14.08	13.92	17.00
July	13.00	14.18	13.89	16.75
	13.01	13.76	13.33	18.00
	12.69	13.69	13.25	19.00
	12.44	13.97	13.25	18.00
Aug	12.89	13.74	12.50	18.00
	13.54	14.91	13.67	17.00
	13.19	13.35	14.00	17.80
	13.04	14.45	13.50	18.83
Sept	13.04	—	14.00	17.67
	13.35	14.37	13.38	17.00
	12.78	13.02	13.75	18.00
	13.00	14.21	13.67	17.60
Oct	13.67	14.83	14.59	17.00
	13.50	14.50	14.00	16.90
	15.00	16.00	14.50	17.67
	—	14.70	14.00	17.87
	15.50	—	14.00	18.50

Continued

Appendix Table I continued

Nov	—	—	—	18.40
	—	18.00	—	16.00
	—	18.00	16.00	18.40
Dec	—	16.00	15.00	18.80
	15.60	16.80	—	19.75
	16.00	15.00	—	18.00
	—	—	—	—
Jan 1981	—	17.25	14.50	16.00
	16.33	17.00	17.00	17.00
	16.50	—	15.60	17.00
	—	—	—	18.00
12-month average	13.71	14.57	13.73	17.36
Standard deviation	1.18	1.37	1.04	1.10

Table II. Weekly average price/kg in pesos of whole croaker (*pagotpot*) in selected markets, 1980-1981.

Date	Cabusao	Libmanan	Sipocot	Naga
Feb 1980	11.58	—	6.25	13.33
	11.49	13.00	10.75	14.00
	12.13	12.00	11.63	13.00
Mar	11.42	12.42	11.40	11.67
	—	11.00	10.33	11.50
	10.33	11.44	11.75	11.60
	12.30	9.00	13.25	10.75
Apr	12.25	12.28	12.00	12.00
	10.70	12.60	9.75	13.00
	11.50	12.38	10.68	13.00
	10.60	13.13	—	13.75
May	10.45	10.17	10.00	13.00
	—	12.75	10.17	12.00
	10.34	9.00	11.50	12.00
	8.44	13.50	12.00	12.00
June	13.00	13.75	13.00	14.00
	11.28	11.83	9.50	14.75
	11.30	—	10.00	15.00
	10.83	11.75	11.00	12.00
July	9.63	11.00	11.00	13.00
	9.44	10.00	12.00	13.00
	9.42	12.00	11.00	12.67
	9.00	11.00	10.60	12.50
	9.36	11.75	10.47	12.50
Aug	10.06	11.09	11.25	13.50
	9.48	10.50	10.50	13.00
	9.50	11.75	11.20	12.00
	—	—	10.00	13.67

Continued

Appendix Table II continued

Sept	9.77	11.00	9.90	12.50
	10.28	12.00	10.00	13.00
	-	11.45	-	13.67
	12.50	13.00	9.40	13.50
Oct	11.00	-	12.00	13.25
	11.25	13.00	10.75	13.50
	11.00	-	9.00	14.00
	13.00	-	11.30	14.67
Nov	-	12.30	-	14.33
	-	15.00	-	13.00
	-	13.00	-	13.00
	-	-	-	14.23
Dec	-	12.80	-	13.80
	-	13.20	12.50	14.75
	11.50	13.00	-	14.00
Jan 1981	13.00	-	-	15.00
	13.80	-	12.50	15.00
	-	-	-	15.00
12-month average	10.94	11.97	10.84	13.23
	Standard deviation 1.30	1.30	1.29	1.06

Table III. Weekly average price/kg in pesos of whole herring (*tamban*) in selected markets, 1980-1981.

Date	Cabusao	Libmanan	Sipocot	Naga
Feb 1980	10.10	10.00	10.00	11.00
	11.40	11.25	12.00	10.00
	10.90	11.75	11.25	11.00
	10.50	11.10	10.50	12.50
Mar	9.70	9.25	10.00	11.70
	11.00	10.90	9.40	11.25
	10.70	10.90	10.30	11.30
Apr	10.50	11.60	9.40	13.00
	9.75	11.00	9.90	13.00
	9.80	10.30	8.50	12.00
	9.25	10.20	11.00	11.50
May	10.50	10.10	7.75	9.50
	11.00	10.30	9.50	9.50
	11.00	9.70	-	9.50
	10.70	10.10	10.20	13.00
June	9.00	10.50	-	12.00
	9.60	11.30	10.00	-
	10.30	10.00	10.50	12.00
	10.00	10.40	10.30	10.75

Continued

Appendix Table III continued

July	10.00	10.10	—	10.50
	10.15	11.30	10.00	11.00
	10.40	10.80	9.00	11.50
	9.50	10.30	8.00	11.75
	9.33	10.75	8.75	11.75
Aug	10.25	11.00	8.90	11.30
	11.65	10.25	8.80	11.00
	9.25	11.84	8.60	11.70
	9.25	—	7.00	10.50
Sept	9.20	10.80	8.80	11.30
	10.00	10.80	8.20	12.00
	9.80	10.20	9.30	11.30
	9.70	10.00	10.30	11.25
Oct	9.35	10.30	10.00	12.00
	9.85	10.00	8.90	12.00
	9.50	9.90	8.90	11.50
	10.00	—	9.00	—
Nov	10.00	11.50	—	12.00
	10.10	12.00	10.00	12.00
	9.70	11.60	12.00	12.00
	10.30	10.00	10.00	12.00
Dec	10.70	12.00	—	12.00
	9.70	10.50	10.50	12.00
	10.60	—	—	12.00
Jan 1981	10.90	12.00	11.30	14.00
	11.00	12.20	12.50	14.00
	12.70	—	—	15.00
	—	—	—	15.00
12-month average	10.07	10.73	9.72	11.75
Standard deviation	1.06	0.74	1.19	1.20

Table IV. Weekly average price/kg in pesos of split mullet (*banak*) in selected markets, 1980-1981.

Date	Cabusao	Libmanan	Sipocot	Naga
Feb 1980	10.00	—	10.00	12.50
	—	9.50	12.00	11.70
	—	11.40	—	11.70
Mar	11.00	11.80	10.90	12.00
	10.00	10.50	14.00	12.00
	—	12.00	12.25	12.50
	—	—	12.50	12.00
Apr	—	11.50	—	12.00
	—	—	—	12.00
	—	—	—	12.25
	—	10.00	—	12.25
May	—	—	—	12.00

Continued

Appendix Table IV continued

	—	11.50	—	12.00
	—	12.00	11.00	—
	9.50	9.00	—	13.00
June	7.00	10.00	10.00	13.75
	—	11.00	9.80	12.00
	7.00	11.00	10.00	11.00
July	6.90	10.10	10.00	12.00
	7.00	9.80	9.00	11.00
	7.00	7.90	9.40	10.75
	7.00	8.80	—	12.00
	7.00	10.25	9.10	12.00
Aug	7.40	9.50	9.60	11.00
	7.50	9.25	8.00	9.00
	7.50	8.80	—	8.00
	—	—	9.25	9.00
Sept	7.50	10.30	9.40	11.25
	7.00	9.10	8.00	—
	—	10.10	9.30	12.00
	7.50	10.00	8.80	11.00
Oct	7.50	10.30	9.30	12.80
	7.10	7.80	9.10	15.70
	8.50	8.60	9.30	10.00
	7.50	—	8.60	10.00
Nov	7.90	10.00	10.00	11.33
	8.10	12.00	8.50	10.00
	—	10.30	—	10.00
Dec	8.70	10.40	9.00	10.70
	9.15	10.50	9.50	12.00
	—	8.00	9.80	11.00
Jan 1981	8.20	10.70	—	12.00
	—	11.75	10.25	12.00
	—	—	11.60	12.00
	—	—	—	12.00
12-month average	7.94	10.15	9.73	11.56
Standard deviation	1.13	1.18	1.62	1.29